

WHAT IS THE REAL *ISWAROIDES*  
(HYMENOPTERA: TIPHIIDAE: THYNNINAE)?

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*Abstract.*—Phylogenetic relationships among *Iswaroides* Ashmead, *Thynnoturmeria* Rohwer, *Acanthothynnus* Turner, *Aspidothynnus* Turner, and *Epactiothynnus* Turner are reexamined. As a result of this analysis, synonymy of *Thynnoturmeria* under *Iswaroides* is confirmed. *Iswaroides* is redescribed and species placements corrected for this revised generic grouping. Twenty-three species are placed in *Iswaroides*, and the new species *Iswaroides robusta* is described.

*Key Words:* Tiphiidae, Hymenoptera, *Iswaroides*, *Thynnoturmeria*, Australia, *Acanthothynnus*, *Aspidothynnus*, *Epactiothynnus*

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Several generic groupings of Australian thynnine tiphiids are part of the confusion over the identity of *Aeolothynnus* of Ashmead (1903) versus the concept of *Aeolothynnus* used by Turner (1908). As discussed in detail by Kimsey (1999) Turner's concept of this genus actually was not congeneric with Ashmead's, and his designation of *A. cerceroides* as the type of *Aeolothynnus* included quite a different group of species. Unfortunately, some time earlier Ashmead (1899) had described the genus *Iswaroides*, based on the species *I. koebelei*. Turner never saw the type of *Iswaroides* and simply re-used Ashmead's description in the *Genera Insectorum* review of the subfamily Thynninae (Turner 1910c). Although these two type species are very different one from the other, there are a number of seemingly intermediate species, including one described below, and the distinctions between the two groups have never been clearly resolved.

The difficulty with these generic groupings has several origins. A large part of the

confusion comes from the nomenclatural chaos created by Turner, Ashmead, and Rohwer. This confusion is in turn compounded by our incomplete knowledge of the species diversity. A six-week collecting trip to Western Australia yielded twenty species of *Iswaroides/Thynnoturmeria*, yet only five species have been described from this part of Australia. Based on examination of museum collections there are very few widespread species in this group. "*Thynnoturmeria*" *cerceroides* appears to occur in Western Australia, South Australia, and Northern Territory. However, this entity is actually a cluster of at least three species, all closely resembling one another in coloration, gross morphology, and a peculiarly indented forefemur. However, each of these appears to have a discrete allopatric distribution, with one in SA, one in NT and one in WA.

Thorough phylogenetic analysis of all available species in these groups has revealed that there is no robust support for two genera as represented by *Iswaroides* Ashmead and *Thynnoturmeria* Rohwer.

## MATERIALS AND METHODS

Specimens were studied *in situ* or were borrowed from the following: The Natural History Museum, London, S. Lewis; Hope Museum, Oxford University, C. O'Toole; Australian National Insect Collection, CSIRO, Canberra, ACT, I. Naumann and J. Cardale (CANBERRA); Bohart Museum of Entomology, University of California, Davis, S. L. Heydon (DAVIS), Naturhistorische Museum, Vienna, Austria, M. Fisher (VIENNA), and Western Australian Museum, Perth, Terry Houston (PERTH). Type repositories for the new species described below are indicated by the city name in capital letters in parentheses.

Males of twenty-five putative species were analyzed for this study, including the new species *I. robustus* described below, and representatives of three other genera, *Acanthothynnus sanuae* Turner, *Aspidothynnus fossulatus* Turner, and *Epactiothynnus opaceiventris* Turner. An asterisk (\*) indicates primary types examined for this study. Fifteen of the species given in the data matrix are morphospecies assigned by a letter name, because there does not appear to be an available species name.

Nearly all of the types of species placed in these genera are in The Natural History Museum, London. It has not been possible to restudy these types in light of the reevaluation of *Iswaroides* and *Thynnoturmeria*. Ordinarily this paper would not have been published without correct names or new species names being assigned to these taxa. However, there is considerable need to stabilize the generic framework in this speciose subfamily of wasps because of their roles both in the biodiversity of the Australian continent and their probable importance in population control of soil-dwelling scarab beetles, including imported dung beetles.

Phylogenetic analyses were conducted using the Hennig86 software (Ferris 1988), using branch swapping (mhennig and bb commands), followed by successive weight-

ing and generation of a Nelson consensus tree (Fig. 1).

## PHYLOGENETIC ANALYSIS

## Character States

1. Labrum small, apical plate foreshortened, with row of subapical setae and narrow basal attachment (Fig. 4)(0); labrum large highly sclerotized and aseptose except apical fringe, broadly attached, apex broadly rounded (Figs. 2, 3)(1).
2. Clypeal apex as broad or broader than medial eye width, apical margin broadly truncate (Figs. 2, 3)(0); apex narrow, often medially rounded, narrower than eye width (Fig. 4)(1).
3. Stipal fringe of setae long and dense, continuous along most of inner margin (Figs. 5, 6)(0); stipal fringe reduced to less than half of inner margin (1).
4. Stipes unmodified, stipal fringe occupying more than half of stipes (Fig. 5)(0); stipes shortened and posteriorly twisted, posterior half strongly cupped (Fig. 6)(1).
5. Prementum broad and parallel-sided (Figs. 6, 9)(0); prementum elongate (Fig. 5), often narrowed anteriorly (1).
6. Face flat or slightly concave between antennal socket and eye margin (0); area between antennal socket and eye longitudinally sunken and often polished and impunctate (1).
7. Occipital fossa and oral fossa narrowly separated by a ridge (Figs. 5, 7, 9)(0); broadly separated by flat or concave polished area (Fig. 6)(1).
8. Occipital carina meeting oral carina at an acute angle (Fig. 6)(0); reaching oral carina at an obtuse or right angle (Figs. 5, 7, 9)(1).
9. Vertex with red spot between hindocelli and upper eye margin (Fig. 8)(0); without red spot (1).
10. Pronotum strongly narrowed medially, depressed subapically (0); pronotum elongate medially and flat without transverse subapical depression (1).

Table 1. Character matrix for genera and species related to *Iswaroides*.

Taxon	Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Epactiothynnus</i> <sup>1</sup>		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Acanthothynnus</i> <sup>2</sup>		1	0	0	0	1	0	0	0	0	1	0	0	0	0	2	0	0	1
<i>Aspidothynnus</i> <sup>3</sup>		1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Iswaroides baccata</i>		1	0	0	0	0	1	0	1	1	1	0	1	1	0	1	1	1	0
<i>I. cerceroides</i>		1	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	1	0
<i>I. illustris</i>		0	1	0	1	0	0	1	0	1	0	0	1	0	0	1	1	0	0
<i>I. koebelei</i>		0	1	0	1	0	0	1	0	1	1	0	1	0	1	1	1	0	0
<i>I. robustus</i>		0	1	0	0	1	0	0	0	1	0	0	1	0	0	1	1	1	0
<i>I. sanguinolentus</i>		1	0	0	0	0	1	0	1	0	1	1	1	0	1	1	0	1	0
<i>I. xerophila</i>		0	1	0	1	0	0	1	0	1	1	0	1	0	0	1	1	0	0
<i>I. species A</i>		0	1	1	1	0	0	1	0	1	0	1	1	1	1	1	1	0	0
<i>I. species B</i>		0	1	0	1	1	0	1	0	1	0	0	1	0	1	1	1	0	0
<i>I. species C</i>		1	0	0	0	1	1	0	1	0	1	0	1	1	1	1	1	0	1
<i>I. species D</i>		0	1	1	1	0	0	1	0	0	0	0	1	1	0	1	1	0	0
<i>I. species E</i>		0	1	0	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0
<i>I. species F</i>		1	0	0	0	0	1	0	1	0	1	0	1	1	1	1	1	1	0
<i>I. species G</i>		1	0	0	0	0	1	0	1	0	1	0	1	1	1	1	1	1	0
<i>I. species H</i>		1	0	0	0	1	1	0	1	0	1	1	1	0	1	1	1	0	1
<i>I. species I</i>		1	0	0	0	1	1	0	1	0	1	0	1	0	1	1	0	1	0
<i>I. species J</i>		0	1	1	1	0	0	1	0	1	0	0	1	0	0	1	0	0	0
<i>I. species K</i>		0	1	0	1	0	0	1	0	1	0	0	1	0	0	1	1	0	0
<i>I. species L</i>		1	0	0	0	1	1	0	1	0	1	0	1	1	1	1	1	0	1
<i>I. species M</i>		1	0	0	0	1	1	0	1	0	1	0	1	0	0	1	1	0	1
<i>I. species N</i>		0	1	0	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0
<i>I. species P</i>		0	1	1	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0

<sup>1</sup> *Epactiothynnus opaceiventris* Turner.<sup>2</sup> *Acanthothynnus samae* Turner.<sup>3</sup> *Aspidothynnus fossulatus* Turner.

11. Mesopleuron anteriorly rounded (0); anterior declivity margined by a vertical omaulus (1).
12. Mesopleuron with transverse scrobal groove extending anteriorly from scrobe (0); mesopleuron evenly convex without trace of scrobal groove (1).
13. Gastral tergum V evenly rounded subapically (Fig. 16)(0); subapical margin produced into an acute shelf-like ridge (Fig. 15)(1).
14. Gastral sternum V evenly rounded laterally (0); with lateral tooth (1).
15. Gastral sternum VI evenly rounded laterally (0); with lateral tooth (Figs. 15, 16)(1).
16. Volsella convex (0); concave at least on apical half and U-shaped in cross-section with digitus obscured (Fig. 22)(1).
17. Gonocoxal dorsal apex deeply emar-

- ginate medially appearing strongly bilobate (Figs. 18–20) or narrowly unilobate (Fig. 24)(0); apex convex medially, appearing trilobate (Fig. 17)(1).
18. Gonocoxal dorsal apex deeply emarginate medially appearing strongly bilobate or narrowly unilobate (0); apex broadly truncate (Fig. 23)(1).

## RESULTS

Representatives of the closely related genera *Acanthothynnus* Turner, *Aspidothynnus* Turner, and *Epactiothynnus* Turner were used in the analysis as outgroups to polarize the character states. These taxa all belong to the *Iswaroides* group of genera characterized in the males by having a partial or complete transverse carina or ridge at or near the apical margin of the epipygium. Males also have well-developed pe-

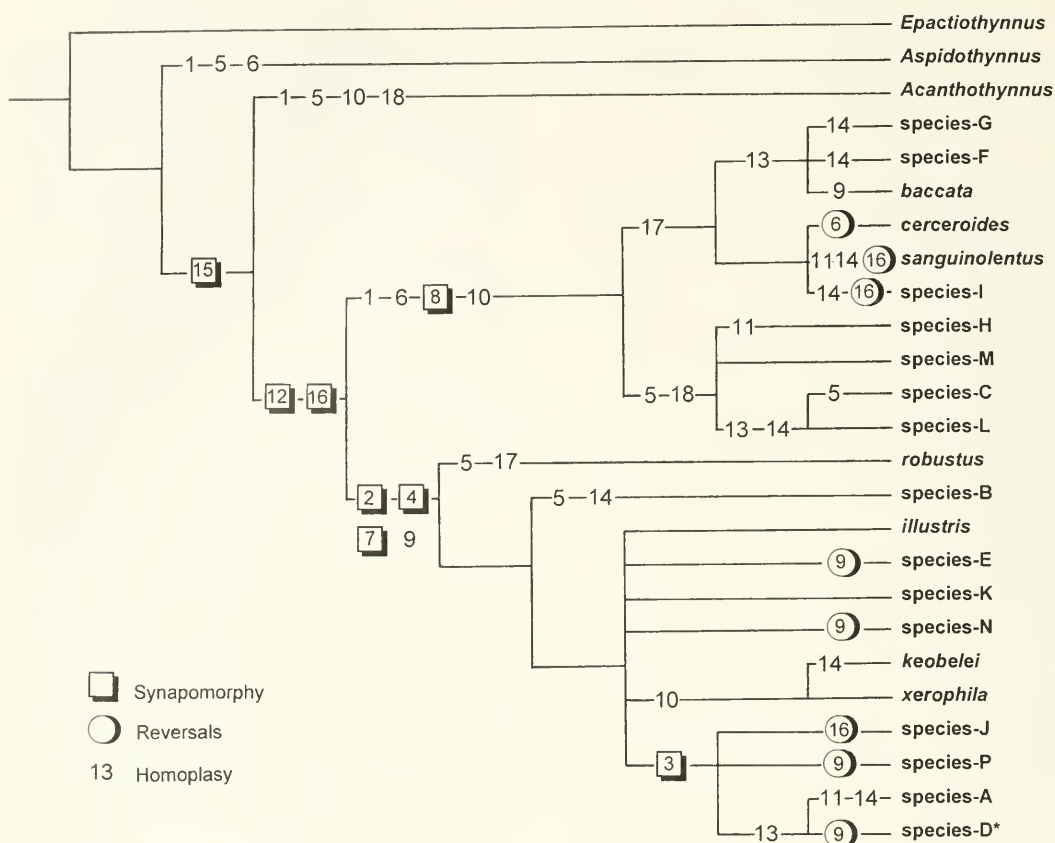


Fig. 1. Cladogram showing phylogenetic relationships among species of *Iswaroides*, *Epactiothynnus*, *Aspidothynnus*, and *Acanthothynnus*.

nis valves and a tridentate hypopygium. Females are characterized by the apical gastral tergum having a smooth, broadly or narrowly ovoid medial plate enclosed at least laterally by a carina and subtended medially by a long dense tuft of setae.

The character matrix, given in Table 1, was analyzed using intensive branch swapping and successive weighting, which yielded ten trees. A Nelson Consensus Tree generated from this last set of trees yielded the tree given in Fig. 1. The ci of the consensus tree was 74, with a retention index of 94. Most of the trees generated came from instability within the apical clades. The intent of this study was not to resolve species level relationships but rather to examine the stability of basal clades and to

see if currently accepted generic groupings could be confirmed or repudiated.

The results of this study are twofold. First, there is little support for retaining *Thymoturneria* and *Iswaroides* as separate entities. Although the types of each genus sort out consistently into two clades the basal rooting of these clades is weak, and they are not sufficiently well supported to justify their division into two genera. These two groups are referred to below as the *keobelei* and *cerceroides* clades. Second, the genus *Epactiothynnus* exhibited the ancestral condition in all of the characters examined for this study. This genus must be reexamined to determine if it is characterized by any apomorphies. If not, then the stability of all of the genera characterized



by the traits discussed above is in question. Given the results of this analysis, the genus *Thynnoturmeria* Rohwer is synonymized under *Iswaroides* Ashmead as the junior name. The entire group, as *Iswaroides*, is rediagnosed below.

The *cerceroides* clade contains the type species of *Thynnoturmeria* (*T. cerceroides*) as well as, *T. baccata*, *T. sanguinolentus* and species C, F, G, H, I, L, and M. The apomorphy supporting this clade is the occipital carina reaching the oral carina at an acute angle. Other characters that distinguish most members of this clade include the large shield-like labrum, polished and sunken area between the eye and the antennal socket and the dorsally flat and medially elongate pronotum. These latter features are also shared with *Aspidothynnus* and *Acanthothynnus* species.

The second clade is distinguished by one apomorphy—the strongly narrowed clypeal apex, as well as the loss of a red spot on the vertex in most, but not all species. Clade 2 contains *I. koebelei* (the type species of *Iswaroides*) *I. robustus*, *T. illustris*, *T. xerophila* and species A, B, D, E, J, K, N and P.

Collectively the *cerceroides* + *koebelei* clade is strongly supported by several apomorphies, including the lack of a scrobal groove, the mesopleuron evenly convex from dorsum to venter, and the peculiar volsella, which is relatively simple, U-shaped in cross section and lacks a visible digitus. The lateral tooth on gastral sternum VI distinguishes this basal clade, plus *Acanthothynnus*, from the other genera under consideration.

Successive weighting emphasized the value of characters 2–4, 7, 8, 12, 15, and 16, assigning these characters the highest values. In addition the following characters of apparent phylogenetic value turned out to be highly homoplasious:

Character 1. In Thynnini the labrum is generally small and is rarely exerted below the clypeus. In the group of genera studied

herein, as well as *Doratithynnus* Turner and *Encopothynnus* Turner, a large shield-like exerted labrum appears in a number of clades, including *Aspidothynnus* and the *T. cerceroides* clade. This feature also occurs in *Thynnus* Fabricius and several other unrelated genera.

Character 5. A narrow and elongate prementum occurs in both clades in basal branches, and is correlated with elongation of the entire tongue, which reaches its most extreme development in *robustus*.

Character 9. The presence of a red spot on the vertex is an enigmatic characteristic of about half the members of the *Iswaroides* group of genera, including *Acanthothynnus*, *Aeolothynnus* Ashmead, and *Psammothynnus* Ashmead. Two-thirds of the *I. koebelei* group appear to have lost these spots. However, for the purposes of this analysis reversing the coding on this feature improved the ci. The presence of spots in this clade is indicated as a reversal on the tree (Fig. 1).

Character 11. The degree of abruptness of the anterior mesopleural declivity varies considerably in this group. A vertical carina or ridge in this group frequently marks this declivity. However, this characteristic is highly variable among species and appears in both clades.

Character 14. Another highly variable characteristic of this group is the presence of a tooth on the sides of gastral sternum V. This tooth is generally associated with a transverse ridge. A similar ridge also occurs on subapical terga. The type species of *Iswaroides* (*I. koebelei*) and *Thynnoturmeria* (*T. cerceroides*) represent the opposite extremes of this feature. In *I. koebelei* this carina is well-developed and protrudes shelf-like on segments III–VI (Fig. 15). Whereas in *T. cerceroides* there is no trace of a carina, although its position is indicated by a slight sulcus and swelling (Fig. 16). The development of this carina and sternal dentition occurs in a number of species in both clades, including *T. sanguinolentus* and *T. baccata* in the *T. cerceroides* clade and *T.*

*xerophila* in the *I. koebelei* clade. The degree of development also varies considerably from one species to the next, with many intermediates in development between the condition seen in *T. cerceroides* and that in *I. koebelei*.

*Iswaroides* Ashmead  
(Figs. 2–19, 21–23)

*Iswaroides* Ashmead 1899: 50. Type species: *Iswaroides koebelei* Ashmead 1899: 50. Original designation.

*Aeolothynnus* Turner 1910c. Turner's mistaken concept of *Aeolothynnus* Ashmead. *Turnerella* Rohwer 1910a: 349. Type species: *Thynnus cerceroides* Smith 1859: 34. Replacement name for *Aeolothynnus* Turner 1910c (nec Ashmead 1903). Preoccupied by Cockerell 1910c.

*Thynnoturneria* Rohwer 1910b: Replacement name for *Turnerella* Rohwer 1910a. Synonymized by Given 1960.

*Eurohweria* Turner 1911: 608. Invalid replacement name for *Aeolothynnus* Ashmead 1903. Synonymized by Rohwer 1911.

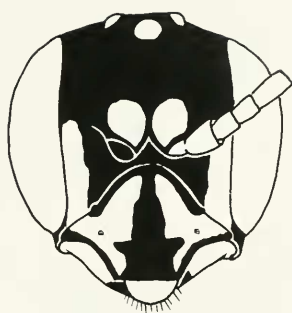
Male.—Body length 7–17 mm. *Head* (Figs. 2–7, 9): Face often longitudinally depressed between antennal sockets and clypeus; clypeus convex in profile apex broadly or narrowly truncate apically, wider or narrower than eye width in front view; labrum large, exerted and shield-like (Figs. 2,3) (as in *cerceroides*) or small and foreshortened, barely visible beyond clypeal apex (as in *koebelei*, Fig. 4); vertex unmodified; antennal lobes usually well developed, may be obsolescent in *cerceroides*; flagellomeres II–XI generally more than twice as long as broad, V–X each with two large tyloids; tongue generally short and unmodified, except in *robustus* (Fig. 10), stipes with elongate fringe of setae (Figs. 5, 6, 9); prementum generally parallel-sided; occipital and oral carinae meeting (Figs. 5, 7, 9), or widely separated (Fig. 6); vertex with small red spot between hindocelli and upper eye margin in some species (Fig. 8). *Thorax*: Pron-

otum often broad and flat dorsally, with strongly developed transverse frontal carina; mesopleuron strongly convex, without trace of transverse scrobal groove, often strongly declivitous anteriorly, with carinate edge in some species; forecoxa usually unmodified, but may be flattened and expanded laterally or posteriorly; forefemur usually unmodified, but may become large and shield-like as in *illustris*; metanotum obscured dorsally by scutellum and propodeum; hindcoxa with large basal carina on dorsal surface; forewing *tcu*-2 vein arising at base of SM-3 cell. *Abdomen*: Segments basally constricted (Figs. 15, 16); sternum I flat to strongly convex or lobate ventrally, as in *illustris*; terga I–VI and sterna II–V with transverse sulcus and/or carina subapically, carina becoming blade-like on apical segments, as in *koebelei* and *xerophila*, carina on apical sterna may end in acute lateral tooth (Figs. 15, 16), transverse sternal sulci obsolescent in *robustus*; sternum VI with acute lateral tooth, generally, but not always, associated with transverse sulcus/carina in all species; sternum VII apically tridentate, with teeth acute and medial tooth longest (Figs. 11–13); tergum VII broadly rounded, with subapical transverse carina laterally and apicomediaally depressed and projecting somewhat ventrally. *Genital capsule* (Figs. 14, 17–19, 23): Penis valves spoon-shaped; parameres broadly rounded apically; volsella large and folded apically, appearing U-shaped in cross-section (Fig. 22), digitus obsolescent or small hidden behind outer wall of cuspis; aedeagus with long basal column topped by slender apical loop or strap; gonocoxa dorsally projecting and apicomediaally unilobate, bilobate, weakly trilobate or truncate. *Color*: Black, often with yellow, whitish and/or red markings: abdomen may be entirely or partly red; wing membrane untinted to infumate.

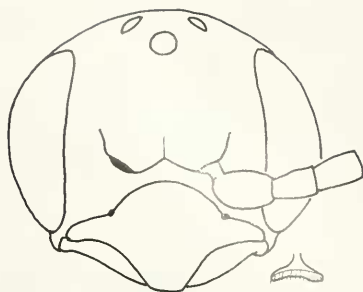
Female.—Body length 4–9 mm. *Head*: Subovoid or elongate and narrowed posteriorly as in *xerophila* and *robusta*, with corresponding longitudinal groove beneath



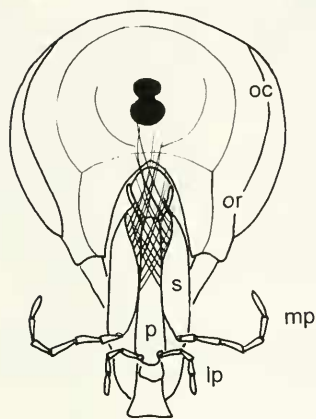
2. species-11



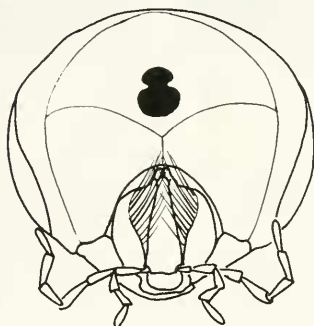
3. *cerceroides*



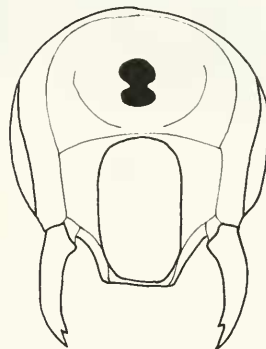
4. *keobelei*



5. species-11



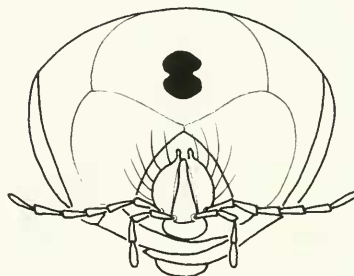
6. *keobelei*



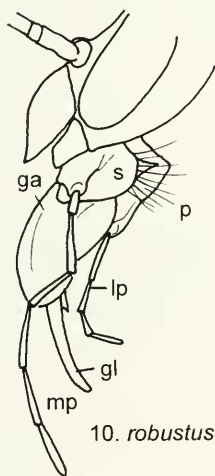
7. *cerceroides*



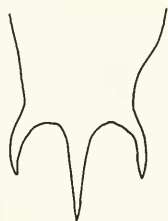
8. *sanguinolentus*



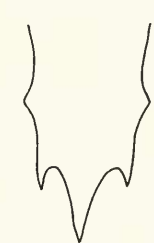
9. species-18



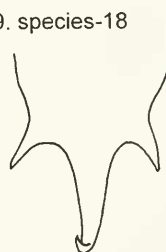
10. *robustus*



11. species-12



12. *cerceroides*



13. species-11

Figs. 2-13. 2-4, Front view of male face (4 with inset detail of labrum). 5-7, 9, Posterior view of male head. (tongue removed on 7). 8, Dorsal view of male head. 10, Lateral view of male head. 11-13, Ventral view of hypopygial apex. Abbreviations: ga = galea; gl = glossa; lp = labial palpus; m = maxillary palpus; oc = occipital carina; or = oral carina; p = prementum; s = stipes.

head on either side or surrounding occipital foramen; mandible slender, sickle-shaped, with shallow subapical notch. *Thorax*: Pronotum broadly subquadrate; scutellum narrowly visible, obscured by pronotum and scutellum. *Abdomen*: Tergum I with W-shaped transverse sulcus; tergum II with one or more transverse carinae; tergum V with laterotergite delimited by oblique groove and/or swelling, area adjacent to laterotergite often with short crescentic carina; tergum VI narrowly ovoid medially, margined laterally with longitudinal carina subtended by elongate tuft of setae (Fig. 21).

*Distribution*.—This genus is found throughout Australia.

*Discussion*.—*Iswaroides* belongs to the group of genera characterized by having a complete or partial transverse carina across the subapical margin of the male apical abdominal tergum, and spoon-shaped penis valves. Females have the apical tergum with an elongate ovoid medial plate delimited laterally by an oblique carina, subtended by a subapical tuft of elongate setae. Among these genera *Iswaroides* species can be immediately recognized in the males by the evenly and strongly convex mesopleuron and lateral tooth on sternum VI. However, the distinction of females in this group is problematic. There are too few females reliably associated with males in collections to distinguish between species level and generic characteristics.

The origin of the name *Iswaroides* is obscure. It seems fairly clear that Ashmead came up with this name as a modification of *Iswara* Westwood, meaning "like *Iswara*." *Iswara* is a tiphiid genus in the subfamily Myzininae. Westwood (1845) does not indicate the origin of *Iswara*. This word is not Greek or Latin, and may be the name of a place or person. In any case Westwood treats the generic name as masculine. Therefore, Ashmead's modification—*Iswaroides* must also be treated as masculine.

*Included species*.—Twenty-three species are placed in *Iswaroides*: *ablatus* (Turner) 1908\* (*Thynnus*); *armiger* (Turner) 1908

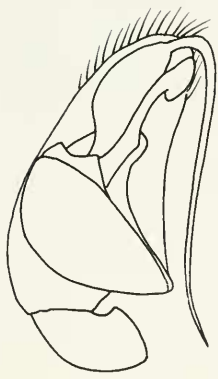
(*Thynnus*); *baccatus* (Smith) 1868 (*Thynnus*); *centralis* (Turner) 1912 (*Thynnnoturneria*); *cercerooides* (Smith) 1859 (*Thynnus*); *compressiceps* (Turner) 1911\* (*Eurohweria*); *crenulatus* (Turner) 1910b (*Aeolothynnus*); *decipiens* (Westwood) 1845\* (*Thynnus*); *eyrensis* (Turner) 1908 (*Thynnus*); *halophilus* (Turner) 1909 (*Thynnus*); *heinricheri* (Dalla Torre) 1897 (*Thynnus*) (replacement name for *Thynnus dimidiatus* Westwood 1845); *illustris* (Kirby) 1896 (*Rhagigaster*); *immitis* (Turner) 1911\* (*Eurohweria*); *lachrymosus* (Turner) 1910a (*Aeolothynnus*); *myola* (Turner) 1911\* (*Eurohweria*); *pentadontus* (Turner) 1911 (*Eurohweria*); *perturbatus* (Turner) 1910a (*Aeolothynnus*); *robustus* Kimsey **new species**, *sanguinolentus* (Turner) 1908\* (*Thynnus*); *saundersi* (Turner) 1908 (*Thynnus*); *unbripennis* (Smith) 1859\* (*Thynnus*) (= *Iswaroides koebeli* Ashmead 1899\*); *xerophilus* (Turner) 1940 (*Aeolothynnus*).

#### *Iswaroides robustus* Kimsey, new species (Figs. 10, 14, 21, 22)

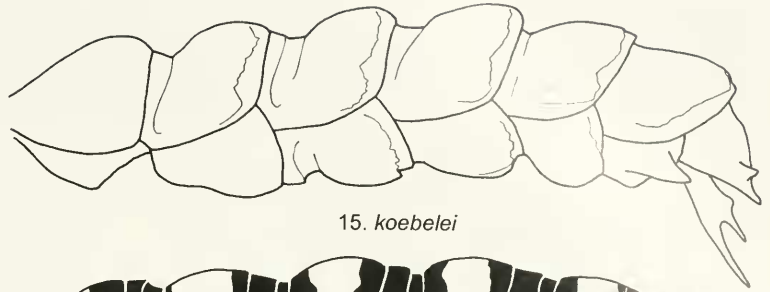
*Male*.—Body length 17 mm; forewing length 13 mm. Head and thoracic punctation contiguous, appearing almost granular; tergal punctation laterally and ventrally shallow and 0.1–0.5 puncture diameters apart, dorsally smaller, shallow and 2–3 puncture diameters apart; malar space 1 MOD long; tongue greatly elongate, particularly the galeae and glossa (Fig. 10); flagellomere I 1.9× as long as broad; flagellomere II length 3× breadth; flagellomere III 3.2× as long as broad; genital capsule (Figs. 14, 22). Body black, with yellow markings on clypeal margin, mandible, antennal lobe, pronotal anterior and posterior margins, tegula, parategula, medial spot on scutum and scutellum, metanotal posterior margin, and anteromedial spot on mesopleuron; small, lateral whitish spot on gastral terga II–IV; wings faintly brown-tinted; legs and antenna black.

*Female*.—Clypeus with narrow apical truncation; vertex strongly arched, and narrowed; gena deeply and transversely in-





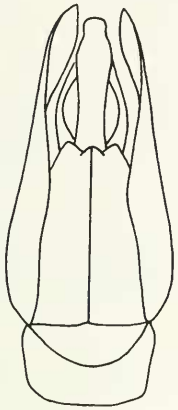
14. *robustus*



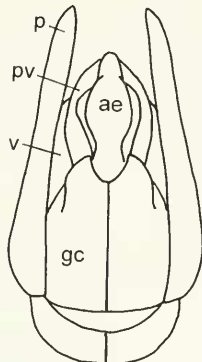
15. *koebelei*



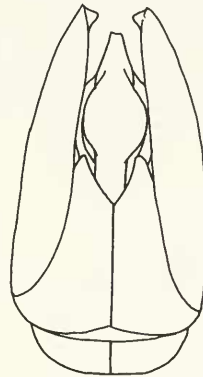
16. *cerceroides*



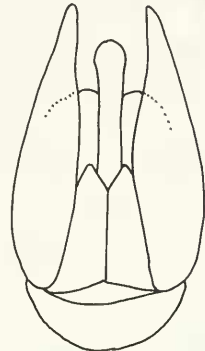
17. *sanguinolentus*



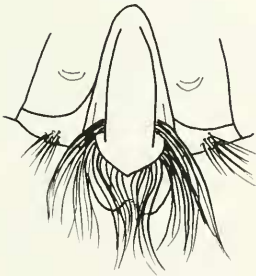
18. *koebelei*



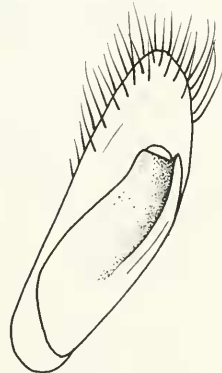
19. *illustris*



20. *Epactiothynnus*



21. *robustus*



22. *robustus*



23. *species-11*



24. *Aspidiothynnus*

Figs. 14–24. 14, Lateral view of genital capsule. 15, 16, Lateral view of male abdomen. 17–20, 23, 24, Male genital capsule (17, lateral view; 18–20, 23, 24, dorsal view). 21, Posterior view of apical segments of female abdomen. 22, Inner view of paramere and volsella. Species representatives of non-*Iswaroides* genera include: *Aspidiothynnus fossulatus* Turner (Fig. 24) and *Epactiothynnus opaceiventris* Turner (Fig. 20). Abbreviations: a = aedeagus; gc = gonocoxa; p = paramere; pv = penis valves; v = volsella.

dented in U-shape below occiput, bulging, around oral fossa; occiput sunken; propleura bulging ventrally before forecoxa; propodeal posterior surface carina-edged laterally; mid and hindtibiae large and bulbous; foretarsus with long acute rake spines; midtibia with large short apically rounded spines on outer surface; forebasitarsus with apically rounded rake spines; hindtarsomeres with apical elongate, acute, rake spines; gastral tergum V deeply emarginate apicomediaally, with small crescentic carina sublaterally; tergum VI elongate ending in angulate apex, with sublateral carinae delimiting smooth ovoid medial area, and subtended by elongate tuft of setae (Fig. 21); sternum VI horseshoe-shaped and deeply indented medially. Body color dark brown. Pubescence long, silky and pale.

Type material.—Holotype ♂: SOUTH AUSTRALIA, Kangaroo Is., Flinders Chase National Park, Rocky River, R. Wharton, (CANBERRA). Paratypes: 4 ♂ and 1 ♀: 1 ♂—"Australia" (VIENNA); 1 ♂—Eyre Hwy., 3 km e WA border, 12 Nov. 1987, T. F. Houston, ex *Eucalyptus* flowers (PERTH); 1 ♂—NSW: 100 km se Broken Hill, 32.51°S 141.37°E, 3–10 Oct. 1988, E. D. Edwards (CANBERRA); 1 ♂, 1 ♀—WA: 41 km e Madura, 31.55°S 127.25°E, 10 April 1981, D. J. Brothers (DAVIS).

Discussion.—This very distinctive species can be immediately recognized in both sexes by its unusually large size, and by the greatly enlarged male tongue. Females may be distinguished by having a short crescentic carina sublaterally on the subapical tergum; one transverse carina on tergum II; the head with the occiput sunken extending into a lateral genal groove; and the body covered with long pale silky setae. This species does not closely resemble any others in *Iswaroides*, in part because it lacks some of the specialized male characteristics seen in other species, including the well-developed transverse tergal and sternal carinae.

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